REMARKS

The instant application was filed on February 22, 2002, and included Claims 1-19. In the Office Action, Claims 1-19 stand rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,108,295, issued to Ohno et al. on August 22, 2000, hereinafter "Ohno", and Claims 1-19 stand rejected in the alternative under 35 U.S.C. 103(a) as being obvious over Ohno. Examiner's rejections will now be discussed in detail.

1. Claims 1-19 stand rejected under 35 U.S.C. 102(a) as being anticipated or, in the alternative under 35 U.S.C. 103(a) as being obvious over Ohno. Examiner contends that Ohno discloses an optical information recording medium that incorporates a phase change alloy used in an optical disk and that the phase change alloy is used in the recording layer made of a thin film of $My_y(Sb_xTe_{1-x})_{1-y}$, wherein $0 \leq y \leq 0.3$, $0.5 \leq x \leq 0.9$ and My may be selected from a group which includes In. Further, Examiner contends that the claimed ranges of the present invention are encompassed by the ranges of x disclosed in Ohno. However, Applicants contend that the references cited by the examiner does not anticipate or render obvious the multi-level recording device claimed by the Applicants. Under MPEP 2131.03, "When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation." Applicants submit that the '295 patent cites no specific example of an optical information recording medium that uses the alloy claimed in the Application, which is $In_x(Sb_nTe_{100-n})_{100-x}$ wherein x is 9-30 and n is 63-82 in currently amended Claim 1. More specifically, the

'295 patent cites no specific example, wherein M_y is In, as claimed in Applicants' Application. The presence of In and the lack of Ag enable the multi-level recording device of the present invention to achieve acceptable SDRs in a wider range of linear track velocities, as illustrated in Table 1. Referring to FIG. 3, in a x-ray diffraction using CuKα, a phase change alloy of the present invention, InSbTe, shows an additional peak at 24-26° as compared to AgSbTe. This shows that a multi-level recording device of the claimed invention is different than one binary optical device of the '295 patent. The phase change alloy of the multi-level recording device of the present invention to selectively crystallize at low and high linear track velocities, particularly when the phase change alloy has a sufficient amount of In. The multi-level recording device of the present invention is not anticipated or obvious in view of the '295 patent, as the '295 patent does not enable or suggest a multi-level recording device, let alone one having an alloy in the claimed range of the present invention.

MPEP 2131.03 reads "In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with 'sufficient specificity to constitute an anticipation under the statute.' What constitutes a 'sufficient specificity' is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious." The language relied upon by the examiner can be found at column 4, lines 38-61 of the '295 patent. The phase change alloy of the recording medium of the '295 is $M_y(Sb_xTe_{1-x})_{1-y}$, wherein $0 \leq y \leq 0.3$, $0.5 \leq x$

≤0.9 and M_y is at least one member from selected from the group consisting of In, Ga, Zn, Ge, Sn, Si, Cu, Au, Ag, Pd, Pt, V, Nb, Ta, Pb, Cr, Co, O, S and Se. Applicants contend that the broad range of alloys of the '295 patent does not disclose the Applicants' invention with "sufficient specificity" to constitute anticipation. Further, the '295 patent discloses no examples wherein M_y is In only. The phase change alloy of the present invention is given by the formula $In_x(Sb_nTe_{100-n})_{100-x}$. The use of In in amounts claimed by the present invention give unexpected results. The Applicants submit that Table 1 of the Application shows the unexpected superior performance of InSbTe disks when compared to AgInSbTe disks. Systems containing AgSbTe tend properly crystallize with the two pulse melt crystallization only at slow linear track velocity, e.g. 1.9 m/s, whereas the InSbTe disks maintain acceptable performance, i.e. SDR below 1.5%, at 1.9 m/s, 3.5 m/s and 6.0 m/s. Referring to Document B filed with the Applicants August 22, 2003 response, Fig. 1 illustrates the superior performance of In at various linear track velocities in producing a multi-level recording device. At linear track velocities of 1.9 m/s, 3.5 m/s and 6 m/s, respectively, the InSbTe disks produced a sigma-to-dynamic ratio (SDR) acceptable for producing a multi-level recording device, whereas the AgInSbTe disks produced unacceptable SDRs at 3.5 m/s and 6.0 m/s, which are 1.51% and 2.12%, respectively, as illustrated in Table 1.

Column 11, lines 29-35 of the '295 patent reads:

> "Addition of In is effective to raise the crystallization temperature and thus to improve the archival stability of the amorphous recording bit. To secure the storage stability at room temperature, it is required to be at least 3 atomic %. However, if it is contained more than 8 atomic %, the phase separation is likely to take place, and segregation is likely to result by repetitive overwriting, such being undesirable."

The paragraph above does not indicate that In in amounts greater than 8% is undesirable only with alloys having silver. The paragraph explains the rational for the preferred embodiments and the limits in Claim 1 of the '295 patent. In contrast, the present inventor have found the unexpected results of a multi-level recording device phase change alloy defined by the claimed invention may include In in amounts greater than 8%.

In the present invention, the multi-level recording device claimed by the Applicants is unobvious in relation to the binary recording device of the '295 patent. The range of the variables in the formula for the phase change medium as claimed is specifically chosen to produce a multi-level recording device as described in the current application. Referring to FIG. 3 and the third paragraph under "3. Results", both contained in Reference B filed with the Applicants' response to the April 25, 2003 office action, test results show that InSbTe has better multi-level performance than AgInSbTe. As a result, the multi-level recording including a phase change alloy with the alloy InSbTe claimed by the Applicants provides better multi-level performance than the prior art cited by the Examiner.

In the Office Action, the Examiner indicates that a showing a criticality for the claimed ranges in the present invention may overcome the rejection. Referring to FIG. 3 of Reference B, test results show the ability of an InSbTe alloy to achieve more evenly distributed reflectivity levels than an AgInSbTe alloy. More evenly distributed reflectivity levels enable data writing and error correction systems to be more easily implemented.

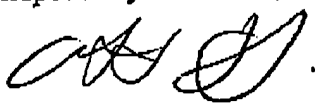
The Examiner contends that the '295 patent discloses a multi-level device at column 4, lines 44-47. The relevant passage is "for recording, retrieving and erasing amorphous marks in the guide grooves by modulation of light intensity of at least two levels by means of a focused light...". The "at least two levels" refers to the light intensity and not to the recording levels of the device, as in the claimed invention. Therefore, it is clear that the '295 patent does not relate to a multi-level recording device, because the '295 patent is relates to a different problem than the claimed invention. Applicants contend that one skilled in the art would not be lead to create the claimed invention from the '295 patent, but instead would be lead to create something entirely different.

Applicants Claims 8-19 give elements of a multi-level recording device not disclosed or suggested by Ohno. Specifically, embodiments of the present invention disclose the use of phase change memory materials in a multi-level recording device that have different characteristics than the phase change materials of Ohno. Please refer to Table 1 of the Applicants' application on page 9 and Figure 3 for comparisons that show the AgInSbTe of Ohno systems are physically different from the InSbTe systems of the present invention. Referring to Table 1, the InSbTe systems of the present invention selectively crystallize with a two-pulse, or slow cooking method at both high and low speeds, in contrast to the AgInSbTe systems preferred in Ohno.

2. In view of the discussion as set forth above, Applicants contend that all rejections have been overcome and Claims 1,3-15 and 17-19 are in condition for allowance. Claims have been amended and Applicants respectfully request reconsideration of the present

application. Applicants respectfully request that Examiner withdraw the rejections and objections and that a timely notice of allowance be issued with Claims 1,3-15 and 17-19. Please enter this amendment under 37 CFR 1.116. The amendments present rejected claims in better form for consideration on Appeal. A Notice of Appeal from the Examiner to the Board of Patent Appeals and Interferences is being sent with this Amendment. Should the Examiner have any comments or suggestions that would place the instant application in better condition for allowance, please contact the undersigned.

Respectfully Submitted,



Anthony J. Serventi

Date:
Energy Conversion Devices, Inc.
2956 Waterview Drive
Rochester Hills, MI 48309
Tel: (248) 293-0440 x6253
Fax: (248) 844-2273
e-mail: ajserventi@msn.com